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PENSOFT

Diversity and distribution of palms (Arecaceae) in Assam, India

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Abstract

We present new information on the diversity and distribution of palms, family Arecaceae, in Assam state, India. The family is represented in the state by 44 species belonging to 19 genera. Our study is based on surveys, a literature review, and a herbarium examination. Identification keys to genera and species, diagnostic characters, vernacular names, and updated information on the distribution, flowering, and fruiting of both wild and cultivated palm species occurring in Assam are provided.

Keywords
Barak Valley, Brahmaputra Valley, documentation, identification, Monocot, Palmae

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Introduction

The family Arecaceae (palms) is represented by over 2500 species globally and have a variety of growth forms such as shrubs, lianas, and trees (Muscarella et al. 2020). Palms are commonly distributed in tropics and subtropics and considered to be the economically important plants, second only to the Poaceae (grasses) (Renuka and Sreekumar 2012; Qureshimatva et al 2020). Palms are used for food, medicine, household materials, furniture, and other purposes (Johnson 1998).

In India, the earliest account of the family can be traced back to the work of van Rheede tot Draakestein's (1678) *Hortus Indicus Malabaricus*. Assam, in the northeastern region of India, is known for its rich biodiversity (Bora and Bhattacharyya 2017). Griffith (1850) reported 19 species, and Blatter (1926) reported 28 species and one variety from Assam. The family Arecaceae was excluded from the *Flora of Assam* (Kanjilal et al. 1934–1940). Detailed taxonomic studies on the family are still unavailable for Assam (Rao and Verma 1970, 1972, 1973, 1974 and 1976; Jain and Hajra 1975; Rahman 2007; Bora et al. 2012; Mehmud and Roy 2020, 2020a, 2020b, 2020c). Renuka and Sreekumar (2012) reported 105 species belonging to 22 genera from India, whereas Barooah and Ahmed (2014) listed 36 species belonging to 18 genera from Assam.

In this backdrop, we investigated the taxonomic diversity and local distribution of Arecaceae in Assam and focus on providing taxonomic details of the species, diversity, and distribution along with their local uses.

Methods

Study area. Assam is a northeastern India state having an area of over 78,000 km^2. The state receives an annual rainfall ranging from 178–305 cm and experience an average humidity of 83% (Baishya et al. 2015).

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Field survey and data collection. We made extensive field surveys to collect palms from August 2017 to February 2020. We conducted 68 trips, either as single-day or multi-day (5–15 day) expeditions throughout reserve forests, wildlife sanctuaries, and non-protected forest areas. We recorded details on distribution, flowering, fruiting, and the vernacular name for each species and collected voucher specimens. Geographic coordinates were recorded using a Garmin etrex 10 GPS receiver.

Specimen collection, identification, and herbarium preparation. The collection of specimens and their preparation for the herbarium followed standard procedures (Jain and Rao 1977; Dransfield 1986). We identified species using the literature (Griffith 1845; Beccari 1908, 1911; Basu 1992; Basu and Chakraverty 1994; Barrow 1998; Dowe 2009; Renuka et al. 2010; Renuka and Shreekumar 2012; Henderson 2007, 2009, 2020) by comparing our specimens with specimens in herbaria of Eastern Regional Centre of Botanical Survey of India (acronym: ASSAM), Central National Herbarium of Botanical Survey of India (acronym: CAL), Gauhati University Botany Herbarium (acronym: GUBH), Meise Botanic Garden Herbarium (acronym: BR) and online herbarium Kew Herbarium Catalogue (acronym: K), New York Botanical Herbarium (acronym: NYBG), Meuseum National d' Histoire Naturelle (acronym: P) and Palm Web (2019). Species names used here follow the accepted names in *The Plant List* (2020). Information related to vernacular names and uses of different species was documented during the field survey by consulting local people. Based on the presence and absence of scales on fruits, the species are categorized into Group A and Group B respectively and site of their collection (voucher specimens) is shown in Figure 1.

Voucher specimens were submitted to ASSAM. Other specimens are kept in the herbarium of the Department of Botany, Cotton University (abbreviated CH here).

Results

We recorded 44 species belonging to 19 genera of Arecaceae from Assam. The genus *Calamus*, with 15 species, is the most diverse, followed by *Pinanga*, *Livistona*, and *Wallichia*, each with three species. *Areca*, *Caryota*, *Dypsis*, *Phoenix*, and *Salacca* each presented two species, and other genera such as *Arenga*, *Borassus*, *Cocos*, *Corypha*, *Elaeis*, *Licuala*, *Plectocomia*, *Ptychosperma*, *Rhapis*, and *Roystonea* were represented by single species. Two species, *Corypha umbraculifera* and *Salacca wallichiana*, are recorded for the first time from Assam.

Key to the genera

1a Fruit scaly **2**
1b Fruit non-scaly **4**

2a Palms acaulescent ..... ***Salacca***
2b Palms non acaulescent **3**

3a Fruit scales margin hairy/wooly; leaflets abaxially white ..... ***Plectocomia***
3b Fruit scales margin not hairy/wooly; leaflets abaxially green ..... ***Calamus***

4a Leaf palmate **5**
4b Leaf pinnate **9**

5a Stem ca 50 cm in diameter **6**
5b Stem less than 50 cm in diameter **7**

6a Hepaxanthic palm; petiole spiny ..... ***Corypha***
6b Pleonanthic palm; petiole serrate or dentete ..... ***Borassus***

7a Rhizomatous; petiole without spine ..... ***Rhaphis***
7b Non-rhizomatous; petiole with spines **8**

8a Flowers ca 2 cm long; fruits red ..... ***Licuala***
8b Flowers ca 0.6 cm long; fruits bluish to red ..... ***Livistona***

9a Palms with bipinnate leaf ..... ***Caryota***
9b Palms with unipinnate leaf **10**

10a Seeds deeply channeled ..... ***Ptychosperma***
10b Seeds shallowly channeled **11**

11a Palms armed **12**
11b Palms unarmed **13**

12a Petiole with acanthophylls; leaflets tip sharp ..... ***Phoenix***
12b Petiole without acanthophylls; leaflets tip not sharp ..... ***Elaeis***

13a Stem covered by black fibre **14**
13b Stems lacks black fibre **15**

14a Leaflets in one plane; auricle ca 3 cm ..... ***Arenga***
14b Leaflets in one or two plane; auricle rarely ca 6 mm ..... ***Wallichia***

15a Fruits large ca 15 cm in diameter ..... ***Cocos***
15b Fruits less than 15 cm in diameter **16**

16a Stem ca 50 cm in diameter; pistillate and staminate flowers in different inflorescences ..... ***Roystonea***
16b Stem less than 50 cm in diameter; pistillate and staminate flowers in same inflorescence **17**

17a Pistillate flowers at the base of rachilla and staminate flowers at apex ..... ***Areca***
17b Pistillate flower in between two staminate flowers **18**

18a Stems ca 8–32 cm in diameter ..... ***Dypsis***
18b Stems ca 2.5 cm in diameter ..... ***Pinanga***

Key to the species of *Areca*

1a. Solitary palm, ca 20 m tall; stamens 6 ..... ***Areca catechu***
1b Clustered palm, ca 3–5 m tall; stamens 3 ..... ***Areca triandra***

***Areca catechu* L.**

Diagnostic characters. Solitary, erect, unarmed palm, 20 m tall; internodes grey-black, 10–16 cm long and 5–8 cm in diameter. Leaf pinnate, 1.5–3 m long; sheath 1–1.5

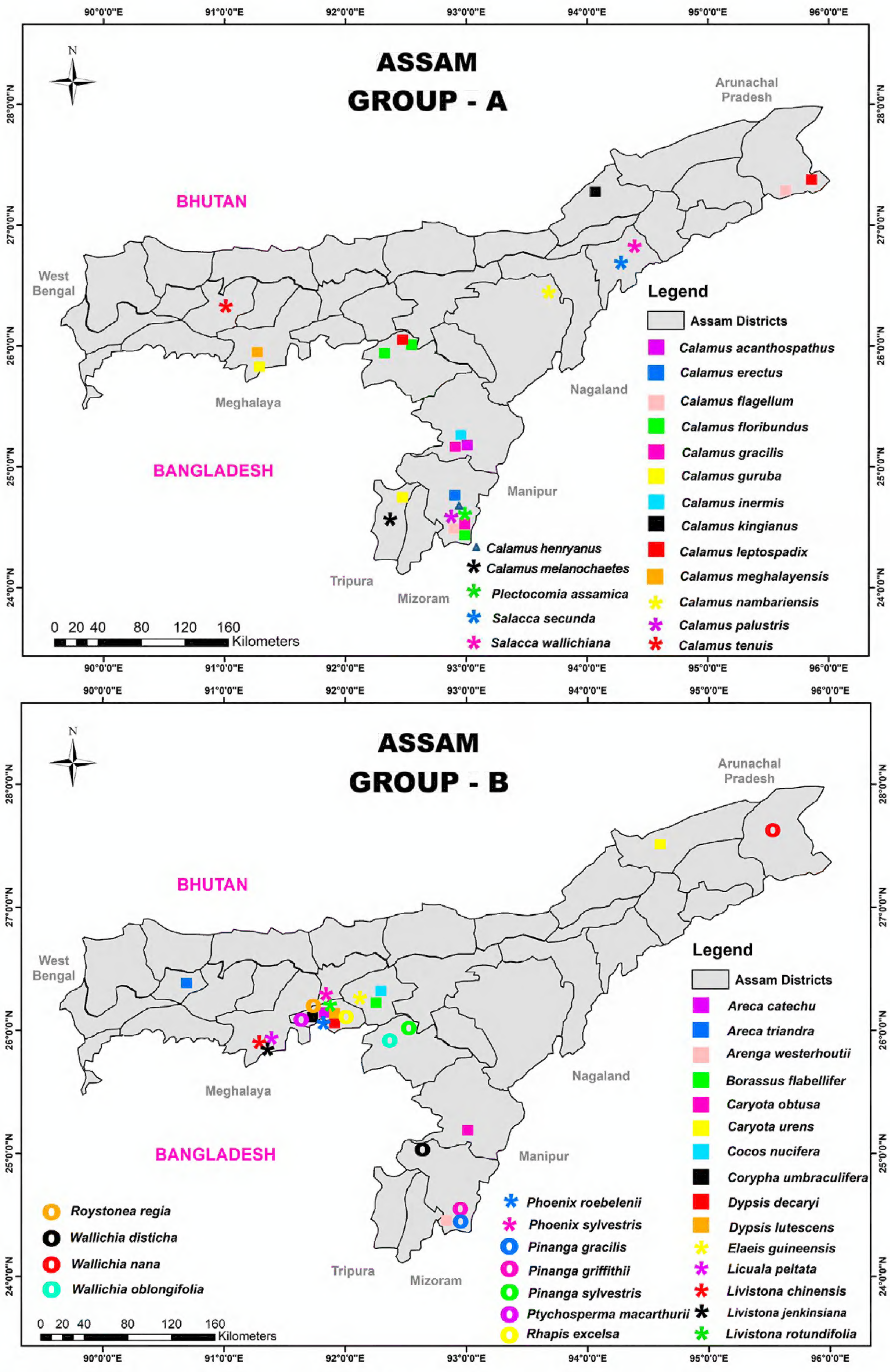

Figure 1. Map of the study area Assam, India. Species records plotted on the map according with the legend.

m long; crownshaft green. Inflorescence branched, interfoliolar below the leaf; spathe 60–72 cm long, light yellowish, tip acute; rachis with many rachilla, 30–35 cm long; pistillate flowers at base and staminate at terminal. Staminate flowers with 6 stamens. Fruit ovoid, red, 3 cm long, and 2.5 cm wide.

Flowering and fruiting. Throughout the year.

Distribution. Throughout Assam.

Vernacular names. Tamul, Gua (Assamese); Gua, Supari (Bengali).

Uses. As food and masticator (nut), broom (leaf), disposable dish (leaf sheath), hut (mature dry stem).

Material examined. INDIA • Assam, Kamrup Metro, Guwahati, Chandmari; 26°11′44″N, 091°46′57″E; 06 May 2018; S. Mehmud leg.; CH.

***Areca triandra* Roxb. ex Buch.-Ham.**

Diagnostic characters. Clustered, unarmed, 3–5 m tall palm; stem green, internodes 10–16 cm long, and 3–4 cm in diameter. Leaf pinnate, 1–1.5 m long; crownshaft 30–45 cm long; leaflets opposite to subopposite, 14–30 per side, 42 cm long, entire, acute to acuminate. Spathe green, oblong, 30 cm long, and 6 cm wide. Inflorescence branched, rachillae green, 20–30 cm long; pistillate flowers at base and staminate flowers at apex. Staminate flowers with 3 stamens. Fruits red, ellipsoid, 3–4 cm long, and ca 1.5 cm wide.

Flowering and fruiting. March to September and March to April, respectively.

Distribution. Common in Assam; wild or ornamental; prefers open fields and hilly areas.

Vernacular names. Ram Gua (Assamese); Garo Tamul (Garo, Assamese).

Uses. Ornamental. As masticator (nut).

Material examined. INDIA • Assam, Mikir Hills district (Karbi Anglong), Bokajan; 21 Jun. 1963; D. B. Deb leg.; ASSAM 34697. • Assam, Bongaigaon, Thakurani Para, Kakoijana Area; 26°25′4″N, 090°39′04″E; alt. 52 m; 25 Mar. 2018; S. Mehmud leg.; CH, ASSAM 96213.

***Arenga westerhoutii* Griff.**

Figure 2A

Diagnostic characters. Solitary, unarmed, 12 m tall woody tree; trunk 25–30 cm in diameter. Leaf pinnate, erect, 4–5.5 m long; petiole green, with black fibre at base. Leaflets auriculate, alternate, 100–130 per side, 28–90 cm long, 5–8 cm wide, linear, adaxially dark green, abaxially silvery white with brown indumentums and prominent midvein, auricle ca 3 cm long and apex serrated.

Distribution. Cachar district; hilly areas.

Material examined. INDIA • Arunachal Pradesh, Dibang Valley, Angolin; 720 m; 27 Aug. 2000; M. Bhaumik leg.; ASSAM 64953. • Assam, Cachar, Borail WLS; 17 Jul. 2011; Hussain Ali Barbhuiyan leg.; ASSAM 85989. • Assam, Cachar, Balicherra, Haflong Road; 24°59′24.6″N, 092°45′10.7″E; alt. 83 m; 09 Nov. 2018; S. Mehmud leg.; CH, ASSAM 96214.

***Borassus flabellifer* L.**

Diagnostic characters. Solitary, erect, 20–25 m tall tree; trunk grey-black, ca 50 cm in diameter, smooth or covered with dry petiole. Leaf costapalmate, 3–3.8 m long; petiole 1.5–1.8 m long, green or yellowish, margin black and serrated. Leaflets up to 70 in number, apices bifid, ca 10 cm long, acute. Staminate inflorescence arise from leaf base, ca 1 m long, with 9–11 alternate branches; bracts ca 50 cm long, tubular; rachis 40–46 cm long, with rachillae 2–4, ca 30 cm. Female inflorescence ca 90 cm long; bracts ca 40 cm; rachillae ca 23 cm. Fruits globose, black, ca 15 cm in diameter.

Flowering and fruiting. March to May and June to November, respectively

Distribution. Common in Assam; plain areas.

Vernacular names. Tal (Assamese).

Uses. As food (fruit), firewood (leaf, inflorescence), hut (leaf).

Material examined. INDONESIA • East Java, Pasuruan, Purwodadi; alt. 300 m; 27 Nov. 1988; Harini leg.; NYBG 02320483. INDIA • 1 ♂; Assam, Morigaon, Thengbhanga; 26°12′30″N, 092°03′12″E; alt. 1 m; 08 Apr. 2018; S. Mehmud leg.; CH, ASSAM 96215.

Key to the species of *Calamus*

1a	Climbing rattan, climbing organ flagella or cirri	**2**
1b	Non climbing rattan, climbing organs absent	***Calamus erectus***
2a	Leaf cirriate; inflorescence without flagella	**3**
2b	Leaf ecirriate; inflorescence with flagella	**6**
3a	Inflorescence boat shaped	***Calamus melanochaetes***
3b	Inflorescence not boat shaped	**4**
4a	Leaflets ovate or lanceolate, arrange in groups	**5**
4b	Leaflets lanceolate, arrange regularly	***Calamus nambariensis***
5a	Leaflets ovate-lanceolate, paired; knee wrinkled	***Calamus palustris***
5b	Leaflets lanceolate, in groups of 2–4; knee smooth	***Calamus inermis***
6a	Leaflets grouped	**7**
6b	Leaflets regular	**10**
7a	Leaflets not more than 8 per side of the rachis	**8**
7b	Leaflets more than 8 per side of the rachis	**9**
8a	Ocrea conspicuous, bristly, ca 5 mm long	***Calamus meghalayensis***
8b	Ocrea inconspicuous, spiny, ca 4–5 mm long	***Calamus kingianus***
9a	Petiole with linear spines, ca 3 cm long; fruits green	***Calamus floribundus***
9b	Petiole with triangular spines, ca 7 mm long; fruits red	***Calamus gracilis***
10a	Stems solitary; above 1200 m elevation; leaf with vestigial cirri	***Calamus acanthospathus***

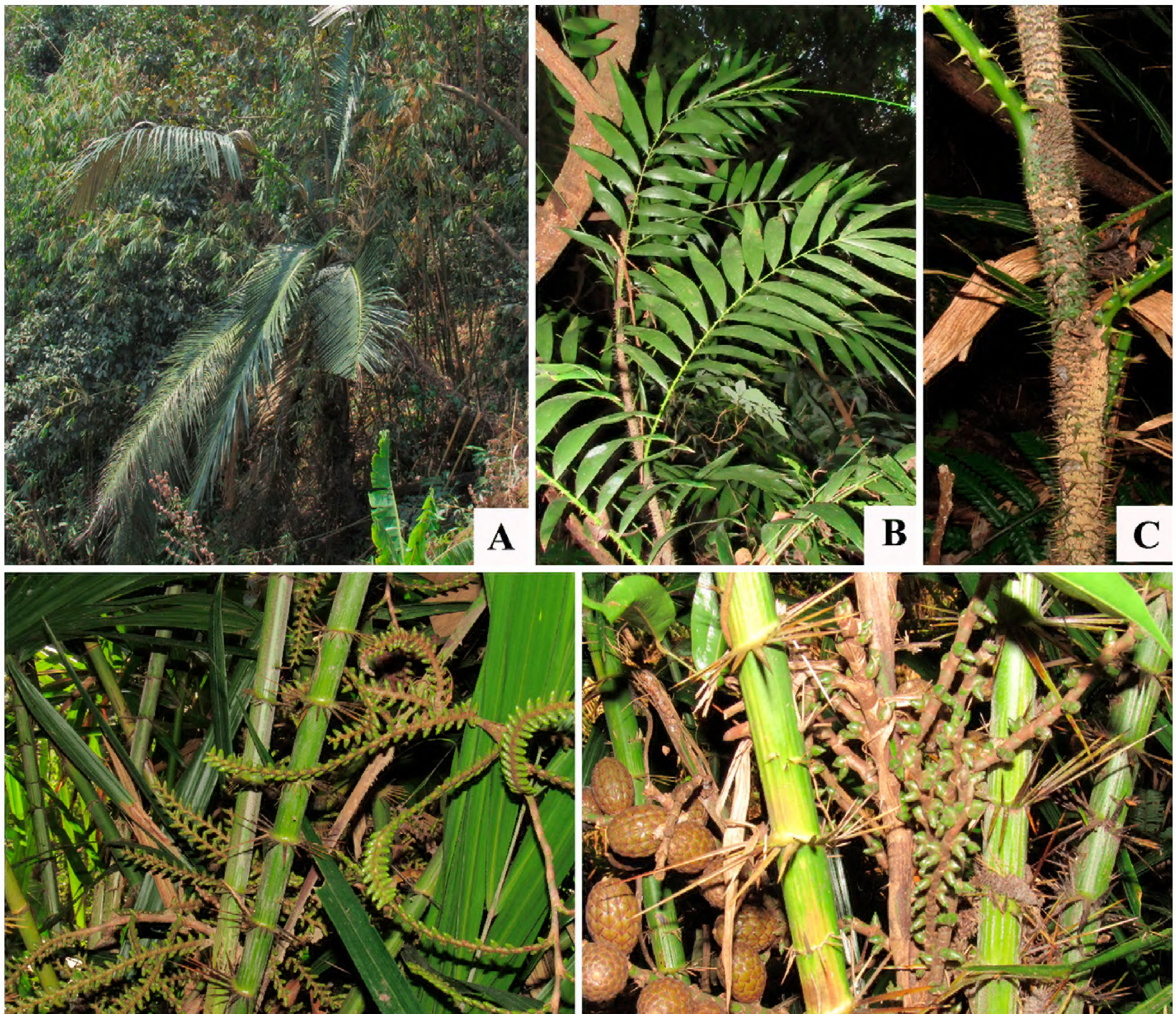

Figure 2. Palms (Arecaceae) in Assam, India. **A.** *Arenga westerhoutii*, habit. **B, C.** *Calamus acanthospathus*: (**B**) habit; (**C**) stem. **D, E.** *Calamus erectus*: (**D**) petiole with staminate inflorescence; (**E**) pistillate inflorescence and fruiting. **F, G.** *Calamus flagellum*: (**F**) staminate inflorescence; (**G**) fruiting branch.

10b Stems clustered; below 1200 m elevation; leaf without vestigial cirri **11**

11a Leaflets terminally connate ... ***Calamus flagellum***

11b Leaflets terminally free **12**

12a Ocrea ca 13 cm long; partial inflorescence bracts ca 20–30 cm long ..... ***Calamus guruba***

12b Ocrea less than 13 cm; partial inflorescence bracts less than 20–30 cm long **13**

13a Ocrea bristly, ca 3 cm; staminate rachillae scorpoid and bracteole up to half portion ..... ***Calamus leptospadix***

13b Ocrea non bristly; staminate rachillae not scorpoid and bracteole at base **14**

14a Stem with brown indumentums; partial inflorescence terminated by a long rachilla ..... ***Calamus henryanus***

14b Stems with silvery-white indumentums; partial inflorescence not terminated by a long rachilla ..... ***Calamus tenuis***

***Calamus acanthospathus* Griff.**

Figure 2B, C

Diagnostic characters. Stems solitary, 10 m long; stems with leaf sheath 2 cm in diameter; spines linear, triangular 0.3–1 cm long. Knee 3 cm long, green, armed by ca 2 mm long spines; ocrea ca 5–6 mm long, spiny. Leaf 1 m long, ecirriate; petiole with single or paired spines ca 1 cm; leaflets regular, 8–13 per side, alternate, lanceolate to ensiform, 30 cm long, acuminate, terminally free, veins 7 in numbers, vestigial cirri ca 2 mm. Flagella 2.5 m long, grapnel spines ca 6 mm long.

Distribution. Dima Hasao district; in dense forest.

Uses. Domestic uses (cane).

Material examined. INDIA • Assam, Khasi & Jaintia Hills, Jowai; alt. 4500 feet; 6 Jan. 1916; Upendranath Kanjilal leg.; ASSAM 30954, CAL 493911. • Assam, Dima Hasao, Jatinga; 25°06′24.2″N, 093°02′55.8″E; alt. 1203 m; 14 Nov. 2019; S Mehmud leg.; CH, ASSAM 96216.

***Calamus erectus* Roxb.**

Figure 2D, E

Diagnostic characters. Stems clustered, non climbing, erect, ca 4 m tall; petioles with linear spines, ca 4 cm long and arranged in whorls. Internodes ca 7 cm long, and 4–6 cm in diameter, green. Leaf pinnate, ecirriate, ca 3.5 m long; ocrea spiny. Leaflets 30–46 per side, lanceolate, 40–65 cm long, ca 3 cm wide, acuminate, veins 3 in numbers, terminal leaflets connate at base. Inflorescence ca 1 m long, flagella absent; partial inflorescence up to 10 in number, 20–25 cm long; staminate rachillae 6–9 cm long; pistillate rachillae 10–15 cm long with dyad flowers. Fruits ellipsoid, brown, 3–3.5 cm long, scales in 12 vertical rows, grooved.

Flowering and fruiting. July to December.

Distribution. Cachar, Dima Hasao and East Karbi Anglong districts; prefers shaded areas.

Vernacular names. Jeng Bet (Assamese).

Uses. As handle for knives (stem).

Material examined. INDIA • Meghalaya, Pynursla; 25°10′51.10″N, 091°53′34.27″E; 30 Mar. 2012; Ramesh Kumar & party leg.; ASSAM 91796. • NEFA (North-East Frontier Agency), Subansiri, New Head Quarters; alt. 241 m; 26 Sep. 1959; G. Panigrahi leg.; ASSAM 20108. • 1 ♂; Assam, Karbi Anglong (Mikir Hills), Kalioni Reserve Forest; 06 Feb. 1977; S. K. Borthakur leg.; ASSAM 76680. • 1♀, 80 cm, F; Assam, Cachar, Bhuban Hill; 24°38′54.3″N, 092°53′43.4.7″E; alt. 1 m; 09 Nov. 2018; S. Mehmud leg.; CH, ASSAM 96217. • 1 ♂; same collection data as per preceding; S. Mehmud leg.; CH.

***Calamus flagellum* Griff. ex Mart.**

Figure 2F, G

Diagnostic characters. Stems clustered, climbing, ca 12 m long, ca 2.5 cm in diameter. Leaf sheath with brown or grey indumentums; spines linear 4.5–5 cm; flagella ca 4.5 m long. Knee 6 cm long; ocrea spiny, 2–3 cm long. Leaf ecirriate, 2.5–3 m long; leaflets regular, 25–33 per side, opposite to alternate, linear, serrated, acuminate, 66–74 cm long and ca 3.5 cm wide, veins 3 in number, terminal leaflets connate. Inflorescences ca 6 m long, flagella 1.5–2 m long; partial inflorescence 5–6 in number, 40–70 cm long; rachillae 10–40 cm long; pistillate rachillae with dyad flowers. Fruits ellipsoid, 2.5–2.8 cm long, scales in 12 vertical rows, greenish yellow.

Flowering and fruiting. October to March and February to March, respectively.

Distribution. Common; near streams.

Vernacular names. Raidang (Assamese); Rai (Dimasha).

Uses. Furniture and other house hold products (cane), food (apical stem).

Material examined. INDIA • Arunachal Pradesh, Dibang Valley, near Jambupani way to Deshali from Hunli; alt. 700 m; 25 Feb. 2004; M. Bhaumik leg.; ASSAM 64981 , 64982. • Assam, Nizamghat; alt. 450 ft; 05 Dec. 1913; Upendranath Kanjila leg.; ASSAM 30917. • 1 ♂; Assam, Cachar, Dwarband; 24°32′25″N, 092° 44′37″E; alt. 12 m; 19 Nov. 2018; S. Mehmud leg.; CH, ASSAM 96218. • 1 ♀; Assam, Tinsukia, Margherita; 27° 14′22.8″N, 095°35′02.7″E; alt. 113 m; 16 Feb. 2019; S. Mehmud leg.; CH, ASSAM 96219.

***Calamus floribundus* Griff.**

Figure 3A, B

Diagnostic characters. Stems clustered, climbing, ca 5 m long; with leaf sheath ca 1.5–2 cm in diameter; spines black brown, linear, 1–3 cm long; flagella ca 2 m long. Knee ca 2 cm long, green, spiny; ocrea spiny or bristly, ca 6 mm long. Leaf pinnate, ecirriate, ca 1.5 m long; leaflets 10–17 per side, 20–41 cm long and 2.5–5 cm wide, alternate to opposite, single or in groups, obovate to lanceolate, serrated, acute, veins 3, terminally connate. Staminate inflorescence 1.5–2 m long; flagella 0.8–0.9 m long; partial inflorescences 10–22 cm long; rachillae 2–5

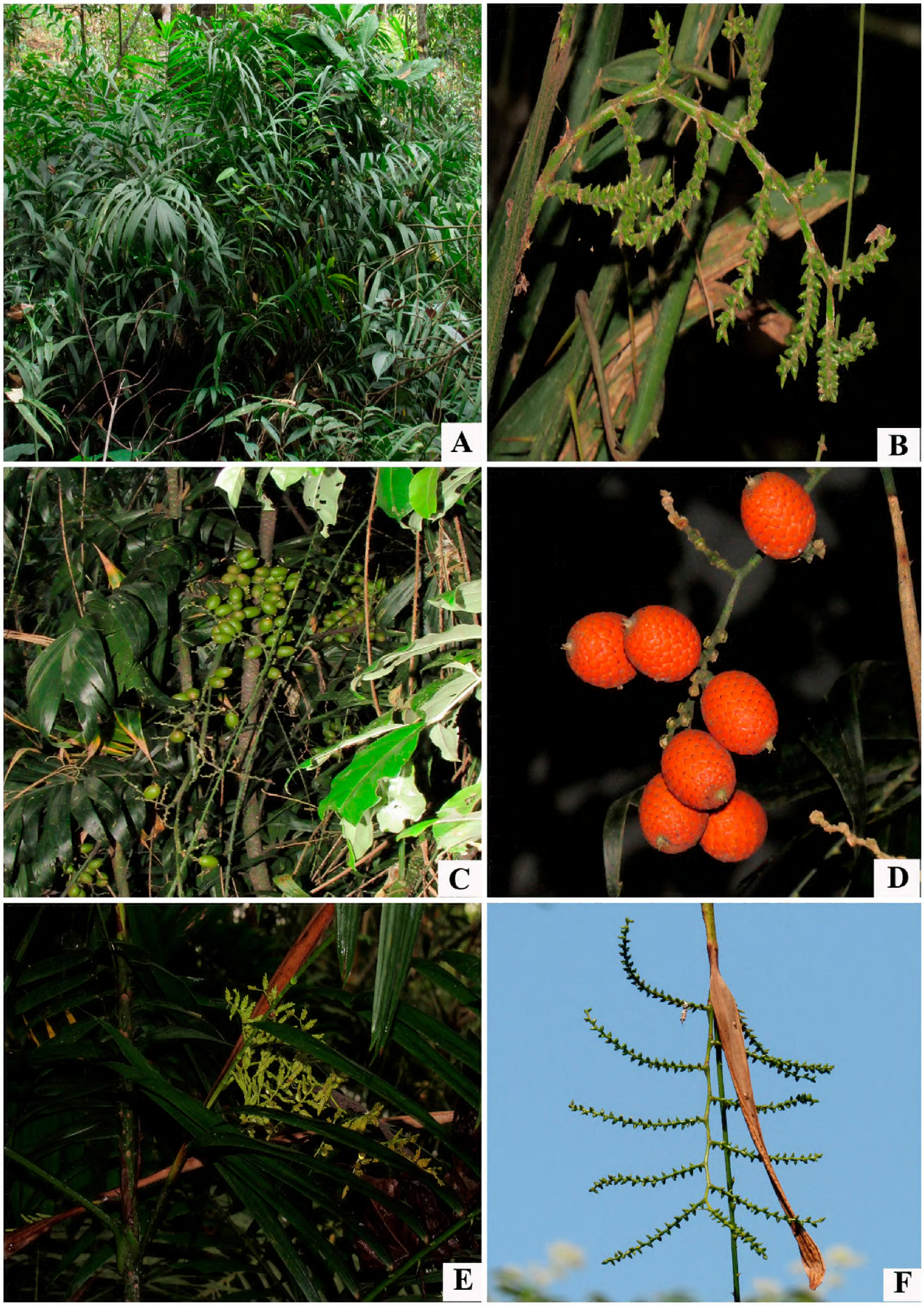

Figure 3. Palms (Arecaceae) in Assam, India. **A, B.** *Calamus floribundus*: (**A**) habit; (**B**) pistillate partial inflorescence. **C, D.** *Calamus gracilis*: (**C**) habit with immature fruit; (**D**) ripe fruit. **E, F.** *Calamus guruba*: (**E**) habit and staminate inflorescence; (**F**) pistillate partial inflorescence.

cm long. Pistillate inflorescence 2–3.5 m long; flagella 1.5–2 m long; partial inflorescences 18 cm long; rachillae alternate, 5–7 cm long with dyad. Fruits globose to ellipsoid, ca 1.3 cm long, green, scales in 15 vertical rows, grooved.

Flowering and fruiting. December to April, May to June respectively.

Distribution. Common; in waterlogged open areas.

Vernacular names. Lejai (Assamese); Pani or Tenga Bet (Rabha).

Uses. As binding material (cane), masticator (fruits).

Material examined. INDIA • Arunachal Pradesh, Namdapha, Miao Forest; 11 Jun. 1982; J. Joseph leg.; ASSAM 66478. • Assam, Khasi & Jaintia Hill, Cherapunjee to Mawmluh; 27 Sep. 1950; G. Panigrahi leg.; CAL. • 1♂; Assam, West Karbi Anglong, Amsoi; 26°07′01.9″N, 092°26′25.4″E; alt. 126 m; 24 Feb. 2018; S. Mehmud leg.; ASSAM 96221. • 1♀; Assam, West Karbi Anglong, Nelie Umapanai Khenduli Tapat Road; 26°02′24.9″N, 092°16′2.9″E; alt. 74 m; 30 Mar. 2018; S. Mehmud leg.; CH, ASSAM 96220. • 1♂; Assam, Cachar, Daulashal; 24°26′16.5″N, 092°49′20.8″E; alt. 03 m; 15 Nov. 2018; S. Mehmud leg.; CH.

***Calamus gracilis* Roxb.**

Figure 3C, D

Diagnostic characters. Stems clustered, climbing, 7–10 m long, with leaf sheath 2–2.3 cm in diameter; indumentums brown; spines triangular, upward pointing, ca 2 mm long; flagella 2.2– 3 m long. Knee ca 2 cm long, wrinkled, spiny; ocrea ca 5 mm long, unarmed. Leaf ecirriate, 30–52 cm long; petiole 0.8–1.2 cm long. Leaflets grouped, opposite, 16–18 per side, ca 26 cm long and ca 3 cm wide, lanceolate to ensiform, serrated, acuminate, tip bent and facing downward, terminally paired, veins 3. Staminate inflorescence ca 90 cm long, flagella ca 6–9 cm long; rachillae alternate, flowers globose. Pistillate inflorescence ca 1 m long; partial inflorescence 13–17 cm long; rachillae 3–5 cm long. Fruits ellipsoid, ca 2.5 cm long, orange-red, scales in 20 vertical rows.

Flowering and fruiting. May.

Distribution. Cachar and Dima Hasao districts; prefer hilly areas.

Vernacular names. Suli Bet (Assamese).

Uses. Binding material for preparation of traditional trays locally known as “dola” and “saloni” (cane).

Material examined. INDIA • Assam, Sibsagar, Kalioni; alt. 340ft; Upendranath Kanjilal leg.; ASSAM 30961, ASSAM 40720. • Assam, Cachar, Daulashal; 24°26′09.4″N, 092°50′35.6″E; alt. 40 m; 26 Mar. 2019; S. Mehmud leg.; CH. • Assam, Dima Hasao, Jatinga; 25°07′56″N, 093°01′17.8″E; alt. 671m; 12 Nov. 2019; S. Mehmud leg.; CH, ASSAM 96222.

***Calamus guruba* Buch-Ham.**

Figure 3E, F

Diagnostic characters. Stems clustered, climbing, 5–8 m long, with leaf sheath 2–3 cm in diameter; spines triangular, ca 1.5 cm long; flagella 1.5–2 m long. Leaf pinnate, ecirriate, ca 1.3 m long; leaflets regular, 30–40 per side, elliptic to lanceolate, serrated, acuminate, 11–34 cm long, 0.7–2.5 cm wide and terminally free. Knee green, 3–3.5 cm long; ocrea 8–18 cm long. Inflorescence ca 3.5 m long; partial inflorescence covered by 20–30 cm long bract; flagella ca 2 m long; staminate partial inflorescences 11–25 cm long, rachillae 0.7–2 cm long; pistillate partial inflorescences 15–17 cm long, rachillae 7–11 cm long, with dyad flowers. Fruits globose, brown, ca 1 cm long, scales in 18 vertical rows.

Flowering and fruiting. November to February and January to February, respectively.

Distribution. Cachar, Darrang, Kamrup Rural, Kamrup Metro, Golaghat, Hailakandi, Jorhat, East Karbi Anglong, West Karbi Anglong, Karimganj districts; prefer open plain and sun exposed areas.

Vernacular names. Bhat Bet, Khagori Bet (Assamese); Sundi Bet (Bengali, Dimasha).

Uses. In fishing equipment (cane).

Material examined. INDIA • 1 ♀; Naga Hill, Rangapaha; 22 Nov. 1964; M. M. Srinivasan leg.; ASSAM 30960. • 1 ♂; Assam, Cachar, Ramprosadpur; Feb. 1944; D. F. O. leg.; ASSAM. • Assam, Sibsagar, Disoi Valley; alt. 350ft; 27 Apr. 1913; Upendranath Kanjilal leg.; ASSAM 30955. • 1♀; Assam, Kamrup Rural, Barkhuli, Ukiam; 25°52′14.2″N, 091°21′11″E; alt. 66 m; 04 Mar. 2018; S. Mehmud leg.; CH, ASSAM 96223. • 1♂; Assam, Karimganj, Fanairbond; 24°25′53″N, 092°25′55″E; alt. 03m; 10 Jan. 2019; S. Mehmud leg.; CH, ASSAM 96224.

***Calamus henryanus* Becc.**

Figure 4A, B

Diagnostic characters. Stems clustered and climbing, ca 8 m long; leaf sheath with brown indumentums and triangular spines, ca. 2 cm long; flagella ca 1.5 m long. Knee glabrous or spiny, ca 2.5 cm long; ocrea ca 2 mm long. Leaf ecirriate, ca 1 m long; leaflets regular, lanceolate; easily distinguishable by its unique partial inflorescence up to 23 cm long where length of rachillae gradually decrease from base to apex but terminal rachilla is comparatively longer than others and the neuter flower with pedicel.

Flowering. November to March.

Distribution. Cachar district (Mehmud and Roy 2020a).

Uses. As binding material (cane).

Material examined. INDIA• 2♂; Assam, Cachar, Bhuban Hill; 24°38′41.6″N, 093°00′52″E; alt. 704 m; 10 Nov. 2018; S. Mehmud leg.; CH, ASSAM 59113. 2♀; Assam, Cachar, Bhuban Hill; 24°38′54.5″N, 093°00′25.6″E; alt. 112 m; 23 Mar. 2019; S. Mehmud leg.; CH, ASSAM 59114.

***Calamus inermis* T. Anders.**

Figure 4C, D

Diagnostic characters. Stems clustered, climbing, 8–15

Figure 4. Palms (Arecaceae) in Assam, India. **A, B.** *Calamus henryanus*: (**A**) stem; (**B**) pistillate partial inflorescence. **C, D.** *Calamus inermis*: (**C**) stem with fruiting; (**D**) stem with staminate inflorescence. **E, F.** *Calamus kingianus*: (**E**) habit; (**F**) pistillate partial inflorescence.

m long, with leaf sheath ca 10 cm in diameter; spines pointing downward, 1–3 cm long; indumentums brown. Leaf pinnate, 2–4 m long, cirri 1–2 m long; petiole 6–7 cm long with 4–5 mm long spines; leaflets many, 50–63 cm long in groups of 2–4, alternate to opposite, inequidistant, lanceolate, serrated, margin bristly, acuminate, with 3 veins. Knee 6–8 cm long; ocrea inconspicuous, acute, ca 4 mm long. Staminate inflorescence ca 1.8 m long, terminating by ca 3–5 cm long non flagellate organ; partial inflorescences 32–58 cm long; rachillae alternate, 4–7 cm long. Pistillate inflorescence ca 1.3 m long; partial inflorescences ca 40 cm long; rachillae zigzag, 8–12 cm long, dyad alternate. Fruits ca 2.6 cm long, perianth tubular and scales in 18 vertical rows.

Flowering and fruiting. November to June.

Distribution. Dima Hasao and East Karbi Anglong districts; prefers hilly areas.

Uses. In furniture (cane).

Material examined. VIETNAM • Khanh Hoa Province, Khanh Vinh, Khanh Trung Commune; 12°22′N, 108°49′E; alt. 450 m; 11 Oct. 2016; Andrew Henderson & Nguyen Quoc Dung leg.; NYBG 02710739. INDIA • 1 ♀; Assam, Dima Hasao, Jatinga; 25°07′56.3″N, 093°01′15.4″E; alt. 684 m; 27 Jun. 2019; S. Mehmud leg.; CH, ASSAM 96225.

Calamus kingianus Becc.

Figure 4E, F

Diagnostic characters. Stems clustered, climbing, ca 9 m long; with sheath ca 1 cm in diameter; spines horizontal, linear ca 5–6 mm long; indumentums white-silvery. Flagella 0.7 m long, spines 5–6 mm long. Leaf ecirriate, ca 55 cm long; petiole 11–12 cm long; leaflets 4–6 per side, single or in groups, lanceolate, ensiform, acuminate, ca 25 cm long, 2–2.5 cm wide, veins 3, and terminally free. Knee ca 1 cm long, spiny; ocrea inconspicuous, ca 1–2 mm long, glabrous or spiny. Pistillate inflorescence flagellate, ca 1.1 m long; partial inflorescences 2–3 in number, with single rachilla, 6–12 cm long.

Flowering (pistillate). March.

Distribution. Lakhimpur district.

Vernacular names. Suli Bet (Assamese).

Uses. As binding material (cane).

Material examined. INDIA • Assam; 15000 ft; Feb 1893; Dr King's collectors, leg.; CAL0000024740. • 1♀; Assam, Lakhimpur, Kakoi Reserve; 27°23′46.7″N; 094°05′38.1″E; alt. 118 m; 09 Mar. 2019; S. Mehmud leg.; ASSAM 96226.

Calamus leptospadix Griff.

Figure 5A, B

Diagnostic characters. Stems clustered, climbing, ca 9 m long, with leaf sheath ca 1.5 cm in diameter; spines linear ca 1–1.5 cm long; indumentums brown to grey; flagella 2 m long. Leaf ecirriate, ca 1.3 m long; petiole 30–40 cm long, with few linear spines, ca 2.5 cm long. Leaflets regular, 33–56 per side, alternate to opposite, 8–22 cm long, ca 1 cm wide, linear, serrated, acuminate, veins 3, and terminal leaflets free. Knee 2 cm long, smooth or spiny; ocrea divided into two parts ca 1.5 cm long, bristly. Inflorescence 2–4 m long, flagellate; rachillae covered by a tubular bracteole up to mid portion. Staminate partial inflorescences 12–36 cm long; rachillae alternate, scorpoid, 2–3 cm long; pistillate partial inflorescences 3–4 in number, 11–15 cm long, rachillae straight, 2–3 cm long, flowers dyad. Fruit globose, perianth explanate.

Flowering and fruiting. January to May and July to August, respectively.

Distribution. Bishwanath Chariali, Cachar, Dima Hasao, Hailakandi, West Karbi Anglong, Kokrajhar, Lakhimpur, and Tinsukia districts; prefer dry undisturbed areas.

Vernacular names. Lejai Bet (Assamese).

Uses. As vegetable (apical branch), binding material (cane).

Material examined. INDIA • Arunachal Pradesh, Dibang Valley, Dambuk; alt. 420 m; 04 Mar. 2004; M. Bhaumik leg.; ASSAM 64972. • 1 ♂; Assam, West Karbi Anglong, Amsoi to Amkachi Road; 26°02′51.7″N, 092° 25′20.6″E; alt. 423 m; 24 Feb. 2018; S. Mehmud leg.; CH, ASSAM 96227. • 1 ♀; Assam, Tinsukia, Jagun; 27° 24′41″N, 095°56′16″E; 13 May 2019; S. Mehmud leg.; CH, ASSAM 96228.

Calamus meghalayensis A. Henderson

Figure 5C, D

Diagnostic characters. Stems clustered, climbing, ca 5 m long, with leaf sheath 0.8–1 cm in diameter; indumentums white; spines horizontal, linear 4–5 mm long; flagella ca 80 cm long. Knee ca 1.4 cm long; ocrea inconspicuous, ca 5 mm long, bristly. Leaf pinnate, ecirriate, ca 50 cm long; leaflets 4–5 per side, in groups, lanceolate, ensiform, 20–25 cm long, 2–3 cm wide, serrated, acute, terminal leaflets connate, rarely free. Inflorescences ca 1.2 m long, flagella ca 25 cm long; bracts mouth bristly; staminate partial inflorescences 3–4 in number, 4–10 cm long; rachillae alternate, ca 1 cm long, scorpoid; pistillate partial inflorescences 8–10 cm long, rachillae alternate, straight, 1–4 cm long with dyad flowers. Fruits globose or ellipsoid, ca 1.6 cm long, perianth explanate.

Flowering and fruiting. August to March and January, respectively.

Distribution. Karmup Rural district; near streams.

Vernacular names. Chorebukla (Rabha); Nari Bet (Rabha, Assamese).

Uses. As binding material (cane).

Material examined. INDIA • Assam, Kamrup, Jara Reserve; 24 May 1957; G. Panigrahi leg.; CAL. • 1 ♂; Assam, Kamrup Rural, Rajapara; 25°52′36.98″N, 091°26′26.35″E; 08 Sep. 2019; S. Mehmud leg.; CH, ASSAM 96229. • 1♀; same collection data as per preceding; CH, ASSAM 96230.

Figure 5. Palms (Arecaceae) in Assam, India. **A, B.** *Calamus leptospadix*: (**A**) habit; (**B**) partial staminate inflorescence. **C, D.** *Calamus meghalayensis*: (**C**) habit and pistillate inflorescence; (**D**) partial staminate inflorescence. **E, F.** *Calamus melanochaetes*: (**E**) habit; (**F**) fruiting.

***Calamus melanochaetes* (Blume) Miquel.**

Figure 5E, F

Diagnostic characters. Stems clustered, climbing, ca 15 m long and with leaf sheath 2.5–6 cm in diameter; indumentums grey; spines flat, linear, 1.5–2.2 cm long; flagella absent. Knee ca 8 cm long, spiny; ocrea inconspicuous, acute, ca 3 mm long. Leaf pinnate, 1–1.5 m long, cirri ca 1 m long; leaflets regular, linear, acuminate, 22–41 cm long, 2–3 cm wide, and veins 3. Inflorescences ca 50 cm long; prophyll ca 45 cm long, boat shaped, adaxially spiny; partial inflorescence 5 or 6 in number, 10–14 cm long, covered by respective bracts similar to prophyll but glabrous; pistillate rachillae with dyad flowers; staminate flowers alternate. Fruit brown, globose, ca 1.7 cm in diameter, scales in 18 vertical rows.

Flowering and fruiting. March to December.

Distribution. Common in Assam; prefers waterlogged plains.

Vernacular names. Houka Bet (Assamese); Gola Bet (Bengali).

Uses. In furniture (cane), Rabha community believes as lactogenic (apical stem), masticator (fruit).

Material examined. INDIA • Assam, Nawgong, Kholahat Reserve Forest; Upendranath Kanjilal leg.; ASSAM 30982. • Assam, Goalpara, Guma Reserve Forest; 21 May 1915; Upendranath Kanjilal leg.; ASSAM 30978. • Assam, Karimganj, Damchera; 24°58′37.2″N, 092°59′17.1″E; alt. 47 m; 18 Nov. 2018; S. Mehmud leg.; CH, ASSAM 96237.

***Calamus nambariensis* Becc.**

Figure 6A

Diagnostic characters. Stems solitary or clustered (2 or 3 in number), ca 15 m long and with leaf sheath 3–4 cm in diameter; leaf sheath spines ca 2–3 cm long, pointing downwards. Flagella absent. Leaf pinnate, 2–3.5 m long, cirri ca 1.2 m long. Leaflets regular, lanceolate, alternate, 20–27 per side, ca 35 cm long and ca 2.5 cm wide, acute, serrated, and veins 3. Knees ca 6 cm long, spiny; ocrea inconspicuous, acute 1–2 mm long. Inflorescences same as *Calamus inermis*.

Calamus namabariensis has been considered to be a synonym of *C. inermis* (Henderson 2020), but we recognize both the taxa as separate species by their differing number of vertical rows of fruit scales. In *C. namabariensis* there are 21 rows (Beccari 1908; Basu 1992; Renuka and Sreekumar 2012; Deka et al. 2018), while in *C. inermis* there are 18 rows (Beccari 1908; Basu 1992; Renuka et. al. 2010).

Flowering. March to June.

Distribution. Jorhat and East Karbi Anglong districts; prefers dense forest.

Vernacular names. Hauka Bet (Assamese).

Uses. In furniture (cane).

Material examined. INDIA • Assam, Nambor Wildlife Sanctuary; 20 Feb. 2016; Kishor Deka leg.; GUBH 18407. • Assam, East Karbi Anglong, Langsoipee Gaon, Koilamati Area; 26°21′21.2′′N, 093°50′49.3′′E; alt. 71 m; 20 Jun. 2019; S. Mehmud leg.; CH, ASSAM 96231.

***Calamus palustris* Griff.**

Figure 6B

Diagnostic characters. Stems clustered, climbing, 15–20 m long and with leaf sheath 2–4 cm in diameter; flagella absent; spines 2–3 cm long, triangular. Knee green, ca 4 cm long, smooth to wrinkle; ocrea inconspicuous, acute, 5–6 mm long. Leaf pinnate, 3–4 m long, cirri 1–1.2 m long. Leaflets lanceolate, ensiform, serrated, acuminate, 19–30 cm long and 5–8 cm wide. Staminate inflorescences 1.2–1.5 m long; partial inflorescences 7–9 in number, ca 50 cm long; rachillae alternate 1.5–5 cm long. Pistillate inflorescence 70–80 cm long; partial inflorescences 5–6 in number, 18–30 cm long; rachillae 8–10 cm long.

Flowering. February to May.

Distribution. Cachar, Dhemaji, Kamrup Rural, and Kokrajhar districts; prefers waterlogged plains.

Uses. For preparation of furniture (cane).

Material examined. INDIA • North Andaman; 29 Mar. 1977; N. P. Balakrishnan leg.; CAL0000056703. • Assam, Cachar, Dwarband; 24°34′39.1″N, 092°44′8.3″E; alt. 32m; 20 Nov. 2018; S. Mehmud leg.; CH, ASSAM 96232.

***Calamus tenuis* Roxb.**

Figure 6C

Diagnostic characters. Stems clustered, climbing, 9–20 m long and with leaf sheath ca 2 cm in diameter; leaf sheath green, spines 1.5–2.5 cm long; indumentums white; flagella 1–1.1 m long. Knee 2.8–3 cm long, spiny; ocrea 5–6 mm long, unarmed. Leaf pinnate, ecirriate, 1–1.2 m long; leaflets regular, linear-lanceolate, serrated, acuminate, 30–34 in number, 29–31 cm long, 2–2.6 cm wide, equidistant, veins 3. Staminate inflorescence 2.5–3 m long, flagellate; partial inflorescences 6–9 in number, 10–22 cm long; rachillae alternate, 3–5 cm long. Pistillate inflorescence 2.5 m long; partial inflorescences 10–13 cm long; rachillae alternate, 2–3 cm long with dyad flowers. Fruit ovate to spherical, ca 1.1 cm long, perianth tubular, scales in 15 vertical rows.

Flowering and fruiting. July to September and December to March, respectively.

Distribution. Throughout Assam; prefers waterlogged plains.

Vernacular names. Jati Bet, Pani Bet (Assamese).

Uses. For furniture (cane), masticator (fruit) food (apical stem).

Material examined. INDIA • 1 ♂; Assam, North Lakhimpur; Jan. 1940; no. 19010; ASSAM 30943. • Assam, Barpeta, Pathsala; 26°30′24″N, 091°14′38″E; 18 Feb. 2018; S. Mehmud leg.; CH, ASSAM 96233.

Key to the species of *Caryota*

1a Solitary; leaflets apex not elongated ..... ***Caryota obtusa***

Figure 6. Palms (Arecaceae) in Assam, India. **A.** *Calamus nambariensis*, habit. **B.** *Calamus palustris*, stem and leaf with staminate inflorescence. **C.** *Calamus tenuis*, habit with staminate inflorescence. **D.** *Caryota obtusa* leaflets. **E, F.** *Licuala peltata*: (**E**) habit; (**F**) fruiting.

1b Clustered or solitary; leaflets apex elongated..... ..... ***Caryota urens***

***Caryota obtusa* Griff.**

Figure 6D

Diagnostic characters. Solitary, erect, 20–35 m tall woody palm tree; trunk 70–80 cm in diameter. Leaf bipinnate, 7–8 m long, at the top, spreading; rachis green-brown; primary pinnae alternate, gradually short towards apex; secondary pinnae 18–22 in number per side, jagged apex not elongated.

Distribution. Dima Hasao district; prefers sun exposed hilly areas.

Material examined. INDIA • NEFA (North-East Frontier Agency), Lohit; 17 Dec. 1969; J. Joseph leg.; ASSAM 53777. • Assam, Dima Hasao, Jatinga Hill; 25°06′41″N, 093°02′32″E; alt. 898 m; 14 Nov. 2019; S. Mehmud leg.; CH, ASSAM 96234.

***Caryota urens* L.**

Diagnostic characters. Clustered or solitary, 20–25 m tall, woody palm tree; internodes 30–35 cm long and 30–50 cm in diameter. Leaf bipinnate, 5–7 m long; sheath green, 2–3 m long, margin with black fibre. Primary pinnae 10–16 in number, gradually short towards apex; secondary pinnae alternate, linear, 25–34 cm long, jagged and tip elongated. Inflorescences below the leaf, 2–3 m long; rachillae 1–1.2 m long; pistillate flower globose, 0.8–1.1 cm long, in between two ovate staminate flowers ca 3 cm. Fruit red to purple, round, 1.5 cm in diameter.

Flowering and fruiting. June to January and September to November, respectively.

Distribution. Throughout Assam; on plains and in hilly areas.

Vernacular names. Sau (Assamese).

Uses. As masticator (fruit), handle sticks and in handlooms (mature stem).

Material examined. INDIA • Assam, Barnadi WLS, Bogamati; alt. 190 m; 12 Sep. 2011; S. R. Talukdar leg.; ASSAM 84162. • Assam, Jorhat, Gibbon WLS; 16 Jun. 2010; Ranjit Daimari leg.; ASSAM 81028. • Assam, Dhemaji, Pera Bhari; 27°33′27.4″N, 094°35′18.9″E; alt. 53 m; 08 May 2019; S. Mehmud leg.; CH, ASSAM 96235.

***Cocos nucifera* L.**

Diagnostic characters. Solitary, erect, 15–20 m tall woody palm tree; trunk brown, 30–35 cm in diameter. Leaf pinnate, 4–6 m long; petiole green, brown fibre at base; leaflets regular, 120–130 per side, 0.7–1 m long, linear, entire, acuminate with prominent midvein. Inflorescences 0.6–1 m long; bracts brown; pistillate flowers at base, staminate flowers at apex of the rachillae; fruits ovate, brown ca. 15 cm in diameter.

Flowering and fruiting. Throughout the year.

Distribution. Throughout Assam.

Vernacular names. Narikol (Assamese).

Uses. Food, oil (fruit), firewood (leaf, stem), broom (midvein).

Material examined. INDIA • Assam, Marigaon; 26°12′30″N, 092°03′12″E; alt. 1 m; 08 Apr. 2018; S. Mehmud leg.; CH.

***Corypha umbraculifera* L.**

Diagnostic characters. Solitary erect, 15–18 m tall woody palm tree, hapaxanthic, 60–70 cm in diameter; trunk black, irregular in size. Leaf costapalmate, 5–5.5 m long; petiole 3–3.5 m long, margins with 2 cm long sharp black spines; leaflets 2.4–3 m long, apices bifid, ca 10 cm long. Inflorescence terminal, ca 2 m long, spreading in all directions. Fruits round, black to violet, ca 1.8 cm in diameter, solitary or in pairs.

Flowering and fruiting. March to August.

Distribution. Kamrup Metro.

Uses. Ornamental.

Material examined. INDIA • Calcutta; 23 Jul. 1898; M. Device leg.; CAL 495172. • Assam, Kamrup Metro, Near Dighali Pukhuri; 26°11′18.6″N, 091°45′17.8″E; alt. 14 m; 30 Mar. 2018; S. Mehmud leg.; CH, ASSAM 96236.

Key to the species of *Dypsis*

1a Stems solitary, ca 25 cm in diameter; leaf arranged in three directions; indumentums brown .... ***Dypsis decaryi***

1b Stems clustered, ca 9–10 cm in diameter; leaf not arranged in three directions; indumentums silvery ..... ***Dypsis lutescens***

***Dypsis decaryi* (Jum.) Beenjte & J. Dransf.**

Diagnostic characters. Stem solitary, erect, black-brown, unarmed, 2.5–4 m tall and 30–32 cm in diameter. Leaf pinnate, ca 2.5 m long; petiole with red and black indumentums; leaves arranged in three directions; leaflets regular, linear, 54–67 cm long, apices bifid. Inflorescence branched and below the leaf, 50–60 cm long.

Flowering. October to November

Distribution. Throughout Assam.

Uses. Ornamental.

Material examined. USA • California, San Diego; 32°44′N, 117°10′W; alt. 30 m; 9 Nov. 1995; Jay B. Walker leg.; NYBG 00201925. INDIA • Assam, Kamrup Metro, Guwahati; 26°08′34″N, 091°47′11″E; alt. 67 m; 13 Jul. 2018; S. Mehmud leg.; CH, ASSAM 96238.

***Dypsis lutescens* (H. Wendle.) Beentje & J. Dransf.**

Diagnostic characters. Stems clustered, erect, 4–6 m tall; internodes green, 8–10 cm long and 5–7 cm in diameter. Leaf pinnate, 2–2.5 m long; crownshaft 40–46 cm long, indumentums silvery white; petiole green, 20–45 cm long. Leaflets regular, 45–61 cm long, ca 2 cm wide, opposite, linear, glabous, ensiform, entire, apices bifid, acute. Inflorescence branched, 0.9–1.1 m long, below the crownshaft; rachillae 9–10 cm long; pistillate flower in

between two staminate flowers. Fruits ellipsoid, 1 cm long, yellow.

Flowering and fruiting. January and June to August, respectively.

Distribution. Throughout Assam.

Vernacular names. Momai Tamul (Assamese).

Uses. Ornamental; as masticator (fruit).

Material examined. WEST INDIES • Tobago; 8 Apr. 1913; W. E. Broadway leg.; NYBG 1662698. INDIA • Assam, Kamrup Metro, Panbazar; 26°11′10″N, 091°45′09.6″E; alt. 31 m; 25 Jan. 2018; S. Mehmud leg.; CH, ASSAM 96239.

Elaeis guineensis Jacq.

Diagnostic characters. Stems solitary, erect, 10–15 m tall; trunk with old petioles; leaf pinnate, 3–4 m long; petiole margin spiny, 1.5–2 cm long; leaflets, linear, opposite, 50–68 cm long, ca 3 cm wide, with prominent midvein. Staminate inflorescence interfoliar, 20–23 cm long; rachillae elongated, 15–18 cm long and terminated by a hook like tip, ca 1 cm long. Pistillate inflorescence ca 15 cm long, globose; partial inflorescences 9–11 cm long. Fruits ellipsoid, black, 3 cm long.

Flowering and fruiting. September to November.

Distribution. Cachar, Goalpara, Kamrup Rural, and Marigaon districts.

Vernacular names. Oil palm (English).

Uses. Palm oil (nut).

Material examined. VIETNAM • Phu Tho Province, Phu Ninh, Tram Than mun; 21°29.21′N, 105°13.33′E; alt. 33 m; 06 Jun. 2006; Phan Ke Loc, Nguyen Sinh Khang, Vu Xuan Manh, Pham Van The, To Van Thao, leg.; NYBG 02384543. INDIA • Assam, Marigaon, Nelie; 26°41′10.9″N, 094°21′12.6″E; alt. 43 m; 16 Sep. 2018; S. Mehmud leg.; CH, ASSAM 96240.

Licuala peltata Roxb. ex Buch.-Ham.

Figure 6E, F

Diagnostic characters. Stems solitary, 2–4 m tall and ca 10 cm in diameter; trunk with old petioles. Leaf palmate, orbicular, ca 2 m long; leaflets 15–22 in number, folded, apices bifid, acute; petiole 1.5 m long, margin with spines, 2–3 cm long. Inflorescence 3–3.5 m long, rachis round; partial inflorescences 4–5 in number, unbranched, 42–65 cm long; bracts tubular. Flowers bisexual, ca 2 cm long, creamy yellowish. Fruits round to ellipsoid, red, ca 2.5 cm long.

Flowering and fruiting. September to January and July to August, respectively.

Distribution. Cachar, Hailakandi, Goalpara, Golaghat, Karimganj and Kamrup Rural districts; observed in hills and open fields.

Vernacular names. Japi Goch (Rabha).

Uses. Ornamental; as masticator (fruit), traditional "Japi" hat (leaf).

Material examined. INDIA • Assam, Cachar, Borail Wildlife Sanctuary; 26 Apr. 2011; Hussain Ahmed Borbhuiyan leg.; ASSAM 84947. • Assam, Kamrup Rural, Chandubi; 25°52′36″N, 091°26′18″E; 14 Sep. 2017; S. Mehmud leg.; CH, ASSAM 96241.

Key to the species of *Livistona*

1a Leaflets apices dropping; fruits ellipsoid, bluish-green ..... ***Livistona chinensis***

1b Leaflets apices not dropping; fruits round, bluish-black or red **2**

2a Stem ca 20 m tall; fruit red ..... ***Livistona rotundifolia***

2b Stem 12–15 m tall; fruit bluish-black ..... ***Livistona jenkinsiana***

Livistona chinensis (Jacq.) R.Br. ex Mart.

Diagnostic characters. Stems solitary, erect, 6–9 m tall and 20–30 cm in diameter, grey. Leaf costapalmate, 3–4 m long; petiole 2–2.5 m long, black fibre at base, margin spiny, ca 2 cm long; lamina ca 1.3 m long. Leaflets 90–100 in number, ca 60 cm long, apices bifid, ca 30 cm long, acuminate and dropping. Inflorescence 1.3–1.5 m long; primary branches 6–7 in number, 30–45 cm long; bracts tubular, 20–25 cm long, indumentums brown. Fruits ellipsoid, bluish-green, 2–2.5 cm long.

Flowering and fruiting. March to April and September to October, respectively.

Distribution. Throughout Assam.

Uses. Ornamental.

Material examined. NETHERLANDS ANTILLES • Saba; 17°37′37″N, 063°13′54″W; alt. 380 m; 11 Mar. 2007; S. A. Mori, C. A. Gracie, W. R. Buck, H. Sipman & S. Nielsen leg.; NYBG 00933709. INDIA • Assam, Kamrup Rural, Rani; 26°02′49″N, 091°35′21″E; alt. 53 m; 11 Nov. 2017; S. Mehmud leg.; CH, ASSAM 96242.

Livistona jenkinsiana Griff.

Figure 7A, B

Diagnostic characters. Stems solitary, erect, 10–15 m tall tree, 25–30 cm in diameter; trunk grey-black, with old petioles. Leaf costapalmate, 2.2–3 m long; petiole 1.5–2 m long, margin with brown curved spines, ca 1.5 cm; lamina 0.9–1.2 m; leaflets 46–53 in number, apices bifid, 6–7 cm long, acute. Inflorescence 1.3–1.4 m long; 3 branched, 70–87 cm long; rachillae 10–42 cm long. Fruits round, bluish-black, ca 2.4 cm in diameter.

Flowering and fruiting. February and May to June, respectively.

Distribution. Baksa, Darrang, Dhemaji, Dibrugarh, Jorhat, Kamrup Rural, Lakhimpur, Nagaon, Sibsagar and Tinsukia districts; wild and domesticated.

Vernacular names. Takou (Assamese).

Uses. For brooms, huts and hats (leaf), masticator (fruit).

Material examined. INDIA • Assam, Kamrup Rural, Borkhuli, Ukiam Road; 25°52′14.2″N, 091°21′11″E; alt. 66 m; 01 Jul. 2018; S. Mehmud leg.; CH, ASSAM 96243.

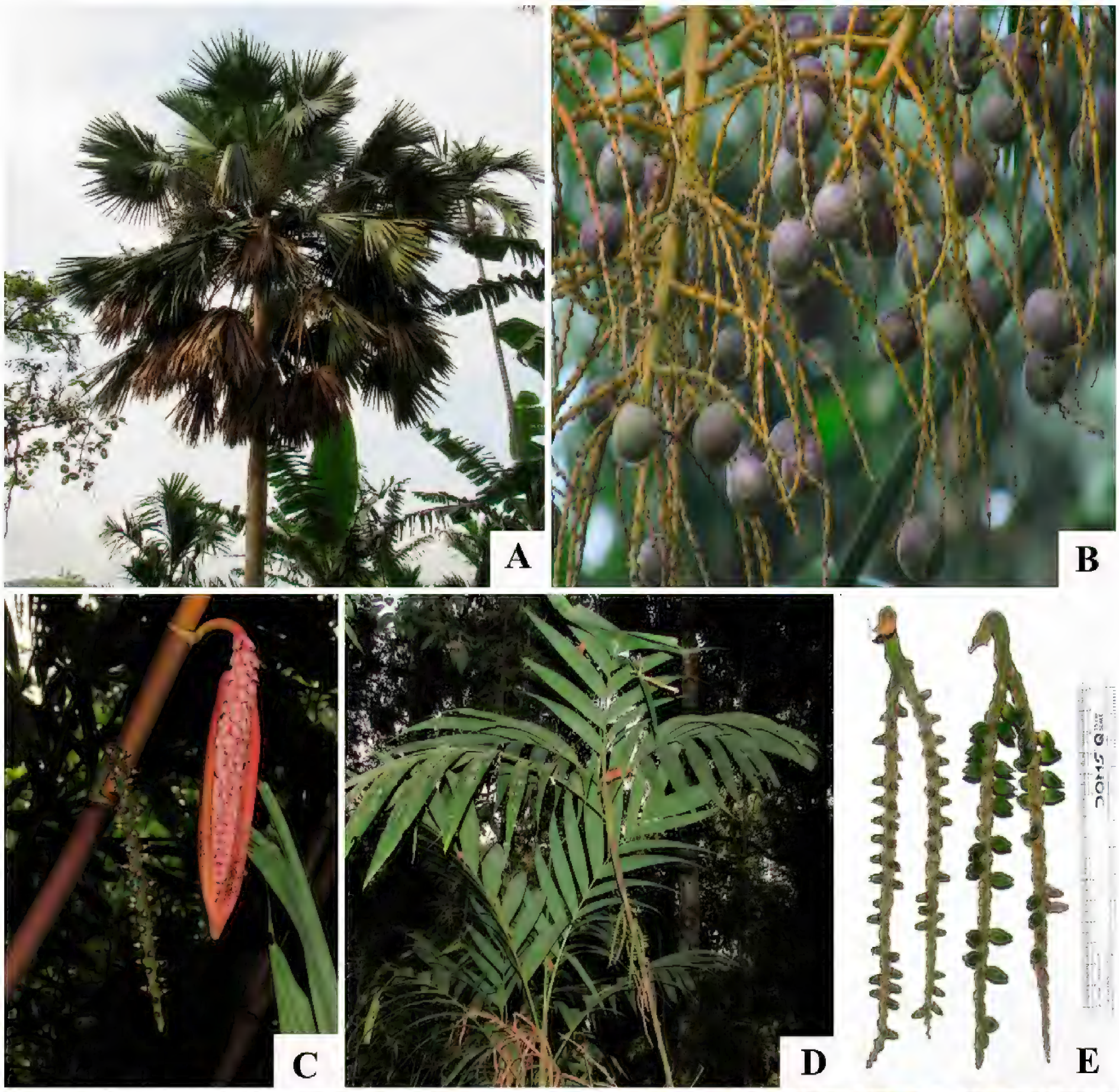

Figure 7. Palms (Arecaceae) in Assam, India. **A, B.** *Livistona jenkinsiana*: (**A**) habit; (**B**) fruit. **C.** *Pinanga gracilis*, flowering. **D, E.** *Pinanga griffithii*: (**D**) habit, (**E**) fruiting. **F, G.** *Pinanga sylvestris*: (**F**) flowering; (**G**) fruiting.

***Livistona rotundifolia* (Lam.) Mart.**

Diagnostic characters. Stems solitary, erect, 25–30 m tall tree, 22–30 cm in diameter; trunk smooth and grey. Leaf costapalmate, 1.8–2.9 m long; petiole curved at the base with brown fibre, red, margin spiny; lamina ca 1 m long, leaflets 0.7–1 m long, apices bifid, ca 12 cm long, acute, glabrous. Inflorescence three branched, 1.8–2 m long; each branch with 6–7 partial inflorescences, 12–26 cm long; rachilla 4–7 cm long; flowers yellow. Fruits round, red, ca 1 cm.

Flowering and fruiting. April to August.

Distribution. Throughout Assam.

Uses. Ornamental.

Material examined. USA • Hawaii, University of Hawaii Campus; 19 Feb. 1962; V. J. Krajina leg.; NYBG 23195621. INDIA • Assam, Kamrup Metro, Guwahati, Panbazar; 26°11′10.9″N, 091°45′07.4″E; alt. 72 m; 05 Apr. 2018; S. Mehmud leg.; CH, ASSAM 96244.

Key to the species of *Phoenix*

1a Palm ca 4 m tall; leaflets arrange in one plane, tip not sharp ..... ***Phoenix roebelenii***

1b Palm ca 30 m tall; leaflets arrange in two planes, tip sharp ..... ***Phoenix sylvestris***

***Phoenix roebelenii* O'Brien, Gard.**

Diagnostic characters. Stems solitary, 1–2 m tall shrubs, and ca 10 cm in diameter. Leaf pinnate, 1–1.5 m long; petiole green, 23–25 cm long; acathnophylls 1–7 cm long. Leaflets 40–42 per side, linear, opposite to alternate, 14–33 cm long, glabrous, entire, acuminate, tip not sharp, and arrange in one plane. Inflorescences 35–37 cm long, rachis light green, 22–25 cm long; rachillae 4–12 cm long: staminate flowers ca 1 cm long, sweet scented, creamy yellowish; pistillate flowers 3–4 mm long. Fruits obovoid to ellipsoid, purplish-brown, ca 1 cm long.

Flowering and fruiting. April to May and July to August, respectively.

Uses. Ornamental.

Material examined. INDIA • Assam, Kamrup Metro, Panbazar; 26°11′10″N, 091°45′9″E; alt. 77 m; 17 Apr. 2018; S. Mehmud leg.; CH, ASSAM 96245.

***Phoenix sylvestris* (L.) Roxb.**

Diagnostic characters. Stems solitary, erect, 14–20 m tall tree, rarely branched; trunk with old petioles, 30–35 cm in diameter. Leaf pinnate, 2–3.5 m long; acanthophylls 10 cm long; leaflets 30–40 cm long, linear, entire, tip sharp and arrange in two planes. Staminate inflorescence erect; rachis ca 14 cm long; rachillae 9–13 cm long; flowers creamy white, ca 8 mm long. Pistillate inflorescence 50–90 cm long; rachillae 32–36 cm long; flowers green, ca 6 mm long. Fruits ellipsoid, yellow 2.5–3 cm long.

Flowering and fruiting. December to February and May to June, respectively.

Distribution. Throughout Assam.

Vernacular names. Khejur (Assamese).

Uses. Food (fruit), fire woods (leaf).

Material examined. INDIA • Assam, Tezpur (Darrang); 23 May 1948; G. K. Deka leg.; ASSAM 37686. • Assam, Darrang, Baihata; 26°20′49″N, 091°46′59″E; alt. 27 m; 19 May 2019; S. Mehmud leg.; CH, ASSAM 96246.

Key to the species of *Pinanga*

1a Leaflets 3–5 in number; inflorescence unbranched; fruits spirally arranged ..... ***Pinanga gracilis***

1b Leaflets more than 5 in number; inflorescence branched; fruits not spirally arranged **2**

2a Fruit arrangement opposite ..... ***Pinanga sylvestris***

2b Fruit arrangement in three directions ..... ***Pinanag griffithii***

***Pinanga gracilis* Bl.**

Figure 7C

Diagnostic characters. Stems clustered, erect, brown-black, unarmed, 3–4 m tall; internodes 7–10 cm long and ca 1.3 cm in diameter. Leaf pinnate, 0.6–1 m long; crownshaft 12–16 cm long, with golden indumentums; petiole 6–10 cm long. Leaflets regular, opposite to subopposite, 3–5 per side, lanceolate to sigmoid, 30–33 cm long, ca 5 cm wide, acuminate at the base with 5 or 6 veins; terminal leaflets connate at base, ca 30 cm long and ca 8 cm wide, tip dentate and apices bifid, entire, veins 9 or 10. Inflorescence below the leaf, 20–33 cm long with single rachilla; pistillate flower small, ca 5 mm, in between two staminate pink flowers, ca 8 mm wide. Fruits ovoid, red, arrangement spiral, ca 1.5 cm long.

Flowering and fruiting. May to June and November to December, respectively.

Distribution. Cachar, Dibrugarh, Jorhat, Kamrup Metro, East Karbi Anglong, West Karbi Anglong, Kokrajhar and Tinsukia districts.

Vernacular names. Geruga Tamul (Assamese); Ram Gua (Bengali, Dimasha).

Uses. As masticator (fruit).

Material examined. INDIA • Assam, Nongpoh Forest; 14 Dec. 1931; Sri Ram leg.; ASSAM 30871. • Assam, Cachar, Daulashal; 24°26′14″N, 092°49′34.6″E; alt. 5 m; 15 Nov. 2019; S. Mehmud leg.; CH, ASSAM 96247.

***Pinanga griffithii* Becc.**

Figure 7D, E

Diagnostic characters. Stems clustered, erect, 1.5–2.5 m long; internodes 7–8 cm long and 2–2.5 cm in diameter. Leaf pinnate, ca 1.1 m long; crownshaft 25–38 cm long, indumentums brown; petiole 15–22 cm long. Leaflets 9–13 per side, 32–43 cm long, 6–8 cm wide, alternate, lanceolate, entire, acuminate, basal leaflets with 2 or 3 veins; terminal leaflets connate, ca 30 cm long, 5–12 cm wide, veins 5 or 6. Inflorescence 22–28 cm long; rachis 4–5 cm long; rachillae 2–4 in number, 19–24 cm

long. Fruits ellipsoid, arrangement in three directions, ca 1.7 cm long.

Flowering and fruiting. September and November to February, respectively.

Distribution. Cachar and Tinsukia districts; in shaded hilly areas.

Vernacular names. Geruga Tamul (Assamese).

Uses. As masticator (fruit).

Material examined. INDIA • Assam, South Lushan Hill; no. 117; CAL 492018. • Assam, Cachar, Daulashal, Inner Line Forest; 24°26′29.4″N, 092°49′26″E; alt. 13 m; 15 Nov. 2018; S. Mehmud leg.; CH, ASSAM 96248.

***Pinanga sylvestris* (Lour.) Hodel.**

Figure 7F, G

Diagnostic characters. Stem clustered, erect, 2–2.6 m tall; internodes black, ca 18 cm long and ca 2 cm in diameter. Leaf pinnate, 1.2–1.5 m long; crownshaft ca 30 cm long, indumentums black-brown; petiole 30–35 cm long; leaflets 11–18 per side, opposite or alternate, linear to lanceolate, 30–52 cm long, 1–3.5 cm wide, veins 2 or 3, terminal leaflets connate. Inflorescence ca 22 cm long; rachillae 2–4 in number, ca. 19 cm long; pistillate flower ca 5 mm long, in between two white staminate flowers, ca 7 mm wide. Fruits ovate, arrangement opposite, ca 1.4 cm long.

Fruiting and flowering. June to July.

Distribution. Cachar, Hailakandi, Jorhat, Kamrup Rural and West Karbi Anglong, districts; near streams, and shaded areas.

Vernacular names. Geruga Tamul (Assamese); Khidali (Tiwa); Koibir (Karbi).

Uses. As masticator (fruit).

Material examined. INDIA • Assam, West Karbi Anglong, Umtereng; 25°50′49.7″N, 092°14′6.6″E; alt. 736 m; 09 Jun. 2018; S. Mehmud leg.; CH, ASSAM 96249.

***Plectocomia assamica* Griff.**

Figure 8A, B

Diagnostic characters. Stems clustered, climbing, 12–18 m long and 8–15 cm in diameter; indumentums silvery-brown; spines linear, greenish to white, 2–3 cm long. Flagella, knee and ocrea are absent. Leaf pinnate, ca 3.5 m long, cirri ca 1.5 m long. Leaflets up to 93 per side, regular, alternate, lanceolate, 42–52 cm long, 5–7.3 cm wide, abaxially white indumentums. Pistillate inflorescence 1.8–2.3 m long, flagella absent; partial inflorescence 6 or 7 in number, alternate, 1–1.2 m long, bract tubular; rachilla 3–4 cm long, alternate, covered by 5–6 cm long bract, tip triangular, adaxially with yellow spores; flowers scented, creamy-yellowish, 4 or 5 per side, bracteole acute, ca 4 mm long. Fruit round, red-brown, scales arranged in ca 53 vertical rows, margin hairy.

Flowering (pistillate) and fruiting. February to March.

Distribution. Cachar, Dibrugarh and Lakhimpur districts; in hilly areas, near streams.

Vernacular names. Rai Bet (Dimasha); Raja Bet (Assamese); Rani Bet (Rabha).

Uses. For furniture (cane).

Material examined. INDIA • Assam; 15 Dec. 1937; ASSAM 30915. • 1♀; Assam, Cachar, Daulashal; 24°27′01.1″N, 092°48′50″E; alt. 46 m; 27 Mar. 2019; S. Mehmud leg.; CH, ASSAM 96250.

***Ptychosperma macarthurii* (H.Wendl. ex H.J.Veitch) H.Wendl. ex Hook.f.**

Diagnostic characters. Stems clustered, erect, unarmed, 2–4 m tall; internodes 12–16 cm long and 4–6 cm in diameter. Leaf pinnate, ca 1.5 m long; crownshaft green with silvery wax; leaflets 28–35 per side, linear, alternate to sub opposite, midvein adaxially prominent. Inflorescence below the leaf, 35–38 cm long, branched; rachillae 14–15 cm long. Fruit ovate, round, red, ca 1.5 cm in diameter, seed grooved.

Flowering and fruiting. January to February and August to September, respectively.

Uses. Ornamental.

Material examined. INDIA • Madras, Pandichery; 12 May 1961; Ph. Guinet leg.; ASSAM 495109. • Assam, Kamrup Metro, Guwahati; 26°11′01″N, 091°46′24″E; alt. 82 m; 16 Feb. 2018; S. Mehmud leg.; CH, ASSAM 96251.

***Rhapis excelsa* (Thunb.) Henry**

Diagnostic characters. Stems clustered, erect, unarmed, ca 1.5 m long and ca 1 cm in diameter; covered by black fibre of leaf sheath. Leaf palmate, alternate, 30–32 cm long; petiole ca 16 cm long; leaflets 6 or 7 in number, 15–18 cm long, connate at the base up to 1–1.2 cm, free parts oblong to linear, ensiform, and veins 2 or 3.

Uses. Ornamental.

Material examined. USA • California, San Diego; 32° 44′N, 117°10′W; alt. 30 m; 16 Feb. 1995; Jay B. Walker leg.; NYBG 00201827. INDIA • Assam, Kamrup Metro, Guwahati; 26°11′10″N, 091°45′09.6″E; alt. 77 m; 14 Jun. 2018; S. Mehmud leg.; CH, ASSAM 96252.

***Roystonea regia* (Kunth.) O. F. Cook**

Diagnostic characters. Stems solitary, erect, 20–30 m tall woody tree, and ca 50 cm in diameter, grey, irregular in size. Leaf pinnate; crownshaft ca 1 m long, green; rachis ca 2–3 m long; leaflets 42–51 cm long, linear. Inflorescence below the leaf, upwards, 1.2–1.4 m long, branched; spathe green, cylindrical, ca 2 m long. Staminate flowers ca 6 mm, and pistillate flowers ca 3 mm; fruit round.

Flowering and fruiting. June to July and January to February, respectively.

Uses. Ornamental.

Material examined. WEST INDIES • Apr. 1904; A. H. Carties leg.; CAL. INDIA • Assam, Kamrup Metro, Maligaon; 26°09′38″N, 091°42′37″E; alt. 63 m; 18 Feb. 2018; S. Mehmud leg.; CH.

Figure 8. Palms (Arecaceae) in Assam, India. **A, B.** *Plectocomia assamica*. **A.** Habit. **B.** Pistillate inflorescence. **C, D.** *Salacca secunda*. C. Habit. **D.** Staminate inflorescence. **E, F.** *Salacca wallichiana*. **E.** Leaf. **F.** Inflorescence.

Figure 9. Palms (Arecaceae) in Assam, India. **A, B.** *Wallichia disticha*: (**A**) habit; (**B**) leaf. **C.** *Wallichia nana* **C.** Habit. **D–F.** *Wallichia oblongifolia*: (**D**) leaf; (**E**) staminate inflorescence; (**F**) ripe fruits.

Figure 10. Palms (Arecaceae) in Assam, India. **A.** *Areca catechu*. **A.** Decoction of mature fruits. **B.** Canes for commercial purposes **C.** *Calamus tenuis*. **C.** Apical shoots as vegetables. **D.** *Calamus flagellum*. **D.** Apical shoots as vegetables. **E, F.** *Calamus melanochaetes*: (**E**) leaf rachises for mat preparation; (**F**) handle sticks. **G.** Frame of hacksaw from cane. **H.** *Livistona jenkinsiana* commercialization of leaves. **I.** *Wallichia oblongifolia* midveins for brooms.

Key to the species of *Salacca*

1a Leaflets regular; bract ca 5–7 cm long ..... ***Salacca secunda***

1b Leaflets grouped; bract ca 25 cm long ..... ***Salacca wallichiana***

***Salacca secunda* Griff.**

Figure 8C, D

Diagnostic characters. Stem acaulescent; leaf pinnate, 4–7 m long; petiole 2–4.2 m long and ca 4 cm in diameter; spines linear, white, clusters of 5–9, 3–7 cm long. Leaflets alternate, regular, 76–80 cm long, ca 5 cm wide, lanceolate, acuminate, serrated and terminal leaflets connate at base. Staminate inflorescence 1–1.3 m long; partial inflorescences 6 or 7 in number, 50–90 cm long; bract 5–7 cm long; rachillae alternate, 11–15 cm long; staminate flowers dyad, compactly arranged, red, and covered by a bracteole.

Flowering (staminate). September to October.

Distribution. Dibrugarh, Jorhat, East Karbi Anglong, and Tinsukia districts; in and waterlogged plains.

Vernacular names. Jenglow, Jeng (Assamese).

Uses. For roof (leaf), edible (fruit).

Material examined. INDIA • Mishmi Hills, Glo, Kamlang Valley; alt. 3000–4000 ft; 06 Apr. 1947; F. Kingdom-Ward leg.; NYBG 02320611. • 1♂; Assam, Jorhat, Mariyani; 26°20′54.5″N, 091°46′02.9″E; alt. 09 m; 02 Sep. 2018; S. Mehmud leg.; CH, ASSAM 96253.

Salacca wallichiana Mart.

Figure 8E, F

Diagnostic characters. Stem acaulescent. Leaf pinnate, 4–6 m long; base light yellowish to pink; spines linear, sharp, brown, 2.5–8 cm long, arrangement irregular. Leaflets in clusters of 3 or 5, 58–60 cm long, 5–6 cm wide, lanceolate, acuminate. Pistillate inflorescences among the leaf ca 60 cm long; rachis with brown indumentums; partial inflorescences 5 or 6 in number, 18–20 cm long; bracts ca 25 cm long; rachillae 5–6 cm long, flowers dyad.

Flowering (pistillate). April to May.

Distribution. Jorhat district; in sunny plains.

Vernacular names. Lichu (Assamese).

Uses. Food (fruit).

Material examined. SIAM • Bankok; 21 Jun. 1920; G. W. Groff leg.; NYBG 02320603. INDIA • Assam, Jorhat, Maibeli; 26°42′04.5″N, 094°26′37.4″E; alt. 60 m; 03 May 2019; S. Mehmud leg.; CH, ASSAM 96254.

Key to the species of *Wallichia*

1a Tree; leaflets linear in two planes; fruiting branch ca 2 m, resupinate ..... ***Wallichia disticha***

1b Shrubs; leaflets oblong in one plane; fruiting branch less than 2 m, upward **2**

2a Palms ca 1 m tall; leaflets 4–5 per side; auricle absent ..... ***Wallichia nana***

2b Palms ca 2.5 m tall; leaflets 30–45 per side; auricle present ..... ***Wallichia oblongifolia***

Wallichia disticha T. Anderson

Figure 9A, B

Diagnostic characters. Stems clustered or solitary, woody, unbranched, 6–9 m tall tree; stem covered by black fibre. Leaf pinnate, alternate, 1.8–3 m long; leaflets paired, arrangement in two planes, 30–60 cm long, 3–5 cm wide, linear, tip serrated, abaxially silvery white and midvein prominent. Fruiting body ca 2 m long; rachillae many, 36–42 cm long; fruit ellipsoid, light greenish, 1–1.5 cm long.

Fruiting. July to August.

Distribution. Cachar district; near streams.

Material examined. INDIA • Assam, Cachar, Borail WLS, Bihara; 09 Oct. 2011; H. A. Borbhuiya leg.; ASSAM 86019. • Assam, Cachar, Kalain; 25°01′34.5″N, 092°29′43.1″E; alt. 42 m; 13 Jan. 2019; S. Mehmud leg.; CH, ASSAM 96255.

Wallichia nana Griff.

Figure 9C

Diagnostic characters. Stems clustered, unarmed, erect, ca 1 m long and 0.8–1.1 cm in diameter. Leaf pinnate, alternate, 50–70 cm long; ligule fibrous, 7–9 cm long; petiole ca 35 cm. Leaflets regular, oblong, 3 or 4 per side, 20–30 cm long, ca 5 cm wide, serrated, abaxially silvery-white, terminal leaflets bilobed. Inflorescence terminal, ca 20 cm long, branched or unbranched; bracts 5–7 cm long, brown; rachilla 7–12 cm long. Fruits ovate to ellipsoid, light green to white, 1.5–2.2 cm long.

Flowering and fruiting. August and September to February, respectively.

Distribution. Kamrup Rural, West Karbi Anglong, and Tinsukia districts; prefers moist area.

Material examined. INDIA • Assam, Jorhat, Nambor Reserve Forest; 21 Nov. 1964; S.K. Kataki leg.; ASSAM 44563. • Assam, Tinsukia, Bherjan; 27°31′27.2″N, 095°22′14.4″E; alt. 84 m; 03 Sep. 2019; S. Mehmud leg.; CH, ASSAM 96256.

Wallichia oblongifolia Griff.

Figure 9D, F

Diagnostic characters. Stems solitary or clustered; leaf pinnate, ca 3.5 m long; petiole ca 2 m long; indumentums brown. Leaflets regular, alternate, 18–26 per side, 45–87 cm long, ca 5 cm wide, oblong, serrated, abaxially silvery white and terminally 3–4 lobed. Staminate inflorescence resupinate, at the base, ca 75 cm long; bracts 4 or 5 in number, 20–28 cm long, alternate, ovate; rachillae yellow, ca 50–60 in number, 20–23 cm long; flowers pink to dark purple pink. Pistillate inflorescences erect ca 80 cm long; rachillae 17–20 in number, 30–48 cm long, green; bracts 24–30 cm long, linear and ovate; pistillate flowers spirally arranged; few neuter flowers at terminal portion of the rachillae. Fruits ellipsoid, red, 1–1.5 cm long.

Flowering and fruiting. April to May and May to November, respectively.

Distribution. Cachar, Dibrugarh, Golaghat, Hailaknadi, Kamrup Metro, Kamrup Rural, East Karbi Anglong, West Karbi Anglong, Kokrajhar and Lakhimpur districts; common in Assam and extend up to 900 m.

Uses. For roofs (leaf), and brooms (midvein).

Material examined. INDIA • Mizoram, Merlan National Park, Pumpet River Forest; 19 Jan. 2013; Ramesh Kumar & Party leg.; ASSAM 87977. • 1 ♂ ♀; Assam, West Karbi Anglong, Nelie Umapanai Khenduli Tapat Road; 26°02′24.9″N, 092°16′29.3″E; alt. 74 m; 06 May 2018; S. Mehmud leg.; CH, ASSAM 96257.

Discussion

We failed to find three species of *Phoenix* during our field survey i.e. *Phoenix acaulis*, *P. loureiroi*, and *P. rupicola* which are reported from Assam (Henderson 2009; Renuka and Sreekumar 2012) but we could not locate voucher specimens in CAL of these three species.

Nonetheless, one voucher specimen of *P. acaulis* was seen in ASSAM (68797); it had been collected from North Cachar Hills district of Assam. *Calamus viminalis* was also previously reported from Assam (Barooah and Ahmed 2014), but we did not find any authentic specimens in CAL and ASSAM. Despite our surveys across the Assam, we did not find *Phoenix acaulis*, *P. loureiroi*, *P. rupicola*, and *C. viminalis* and these species are excluded from our list.

We document the uses of each species in our list based on our own data collected during the field surveys. *Plectocomia assamica* and almost all species of *Calamus* are used for both commercial and domestic purposes. The fruits of *Areca catechu*, *A. triandra*, *Pinanga gracilis*, *Calamus tenuis*, *C. floribundus*, *C. guruba*, *C. melanochaetes*, *Pinanga sylvestris*, *P. griffithii*, *Licuala peltata*, and *Livistona jenkinsiana* are used as a masticator. In Kamrup Rural, the decoction of mature nuts of *Areca catechu* is used to color immature nuts to increase their value (Fig. 10A). Several species of *Calamus* are used for commercial uses in Cachar district (Fig. 10B). The apical shoots of *Calamus tenuis* (Fig. 10C), *C. flagellum* (Fig. 10D), *C. leptospadix*, *C. floribundus*, *C. nambariensis*, and *C. melanochaetes* are used as a vegetable. In Kamrup Rural district, leaf rachises of *C. melanochaetes* is commercially used for mats (Fig. 10E) and stems for handles (Fig. 10 F). The lamina of *Livistona jenkinsiana* are used for hats and roofs in upper Assam, and its cultivation and commercialization were recorded in Dhemaji district (Fig. 10H). In Lakhimpur district, cane is used for the preparation of hacksaw frames (Fig. 10G) and the Nepali community uses the mid-vein of *Wallichia oblongifolia* (Fig. 10I) for brooms; the Dimacha community in Dima Hasao district use leaflets of the same species roofs. In addition to the uses in our study, there have been several other reports on uses of Arecaceae members in Assam as medicine (Borah et al. 2006; Saikia et al 2006; Buragohain and Konwar 2007; Sonowal and Baruah 2011; Choudhury et al 2012; Das et al 2013; Borborah et al. 2014; Das and Teron 2014; Deka and Nath 2014; Gogoi and Juji 2015; Ingtipi et al 2016; Dutta et al 2017; Sarkar and Devi 2017), beverage (Pawe and Gogoi 2013), natural dye (Barukiyal and Sarmah 2011), masticator (Borborah et al 2014; Ingtipi et al 2016; Mehmud and Roy 2020b), food (Pandey and Borah 1997; Patir and Borah 2007; Kar et al 2008; Borborah et al 2014; Das and Teron 2014; Medhi et al 2014; Gogoi and Jiji 2015; Dutta et al 2017; Sarkar and Devi 2017), and household (Dutta et al 2017; Henderson 2007).

We found that some wild palms, such as *Calamus acanthospathus*, *C. gracilis*, *C. henryanus*, *C. kingianus*, *C. meghalayensis*, and *Plectocomia assamica* are restricted in their distribution to parts Assam and require conservation efforts. Our study should be helpful with the identification of the palms in Assam and serve to guide future research on palms in the state.

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Authors' Contributions

SM conducted field surveys, took the photographs, and collected, identified, preserved, and prepared herbarium specimens, consulted other herbaria, and prepared the manuscript; HR guided the entire work and reviewed the manuscript.

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